CAN THE TRAINING COMMUNITY HELP THE TESTING COMMUNITY REDUCE PROGRAM RISK?

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We Must Change Our Culture

Current Culture

1st Mode → Requirements

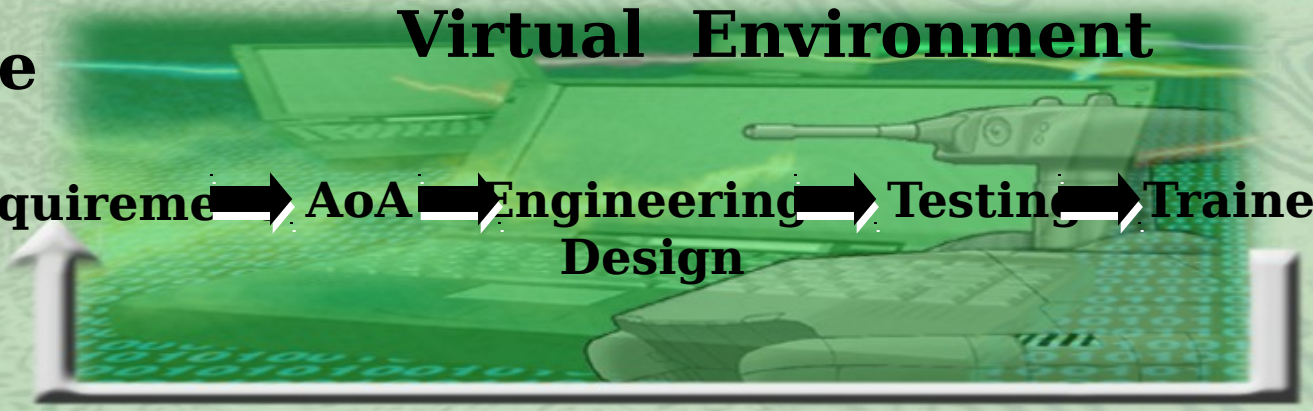
2nd Mod → AoA

3rd Mod → Engineer Design

4th Mode → Testing

5th Mode → Trainers

New Culture



Virtual Environment

One Mode → Requireme → AoA → Engineering Design → Testing → Trainers

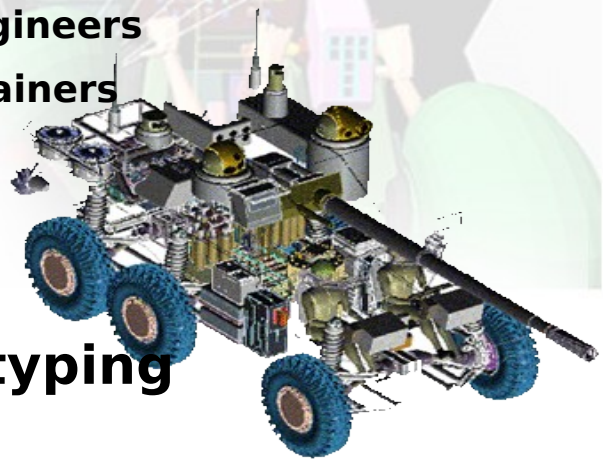
Pre-planned Product Improvement

We Must Change Our Culture

Currently

- We treat the prototype as the end product of thought not a partner in the thinking process

Contractors
Design Engineers
Testers / Trainers



- And we use multiple models

"When a model starts to harden, so does a lot of the thinking!"

Now is the time to change

- Industry has moved to rapid prototyping of one model in simulation to increase human interaction across the organization

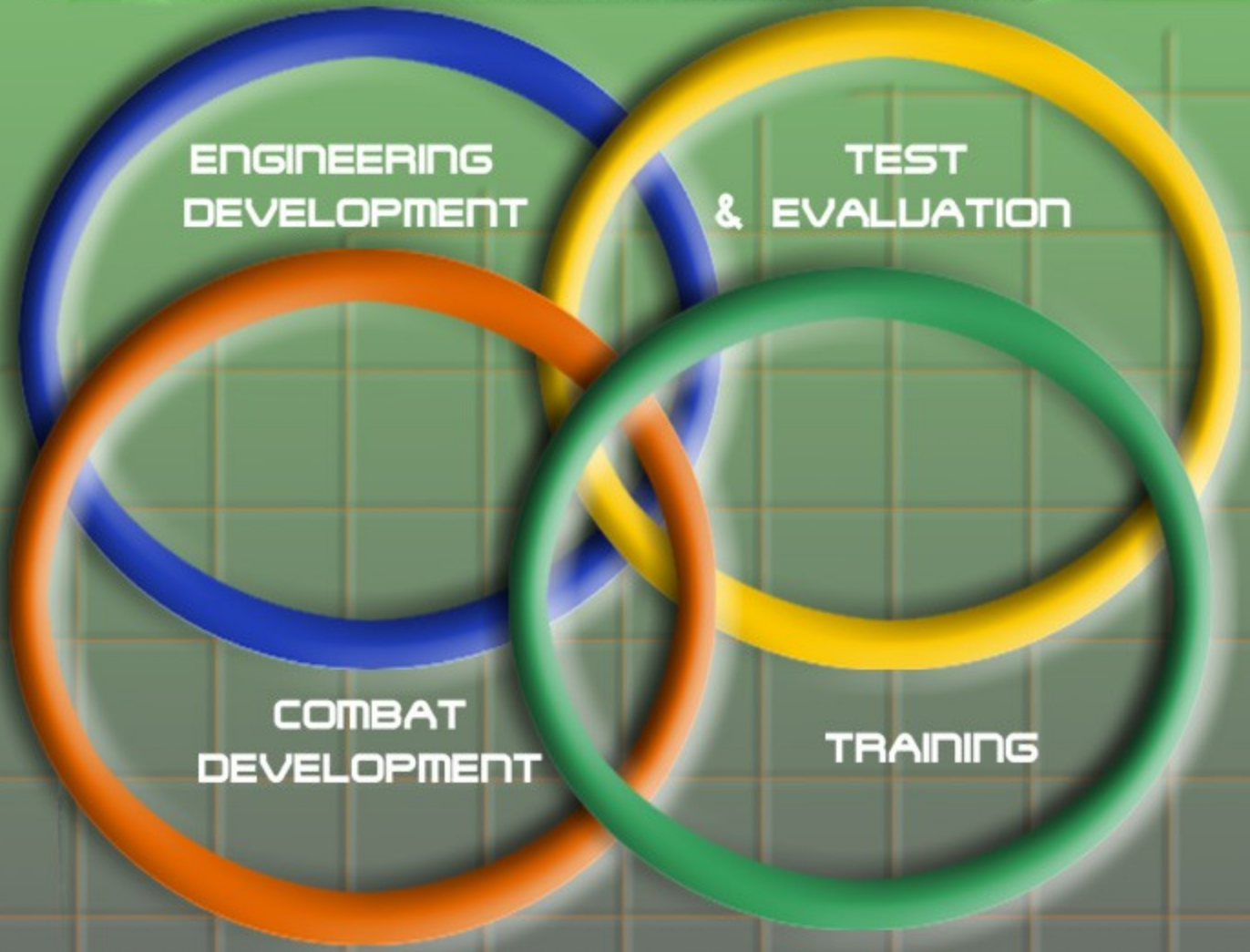
- The
that?

A Prototype should be an invitation to play, lets fail often and early!

SMART is the Key!

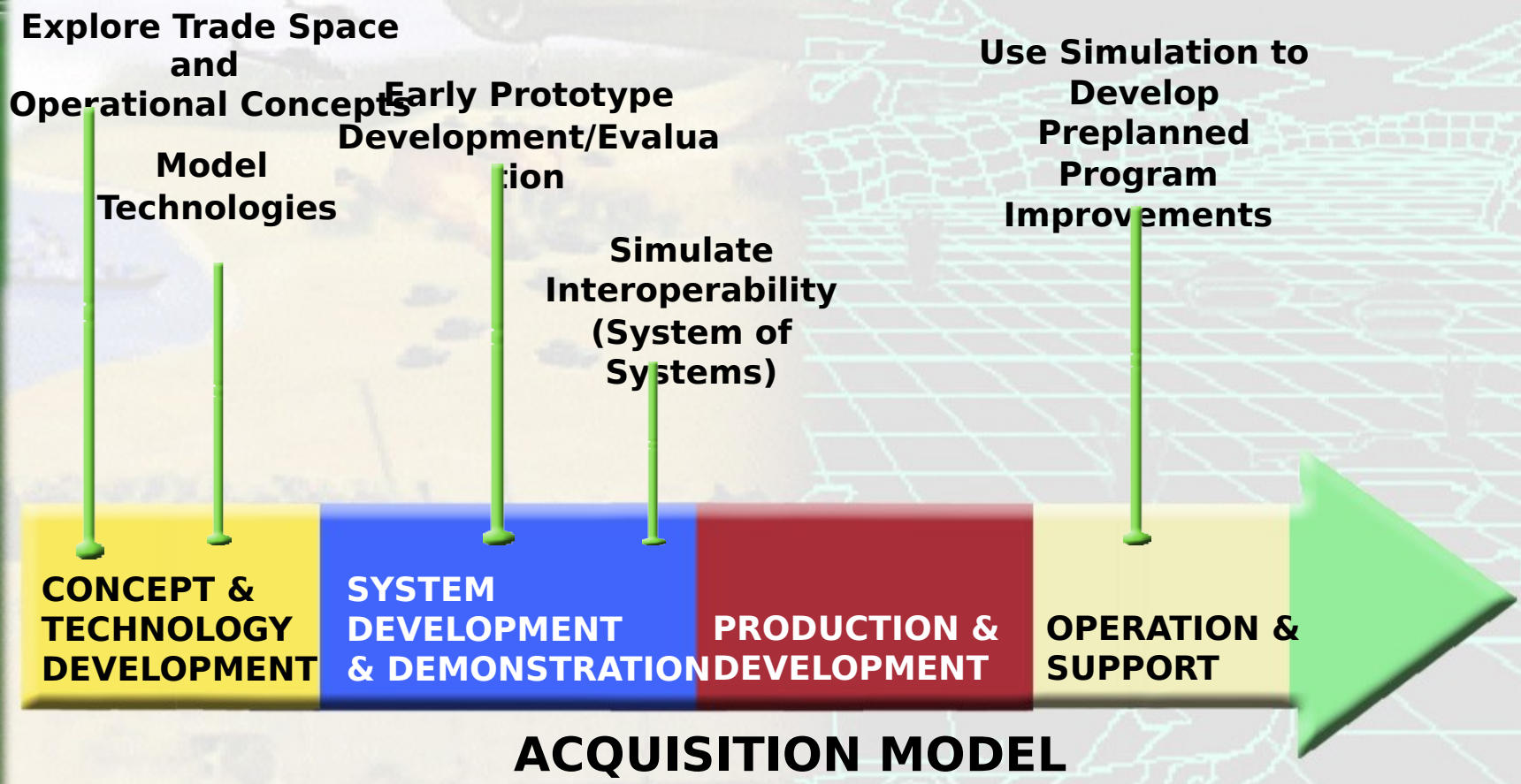
- **Design Faster**
- **Collaborate Earlier and Easier**
- **Explore Alternative Designs**
- **More Realistic (Sights, Smells, Sounds)**

The New Collaboration

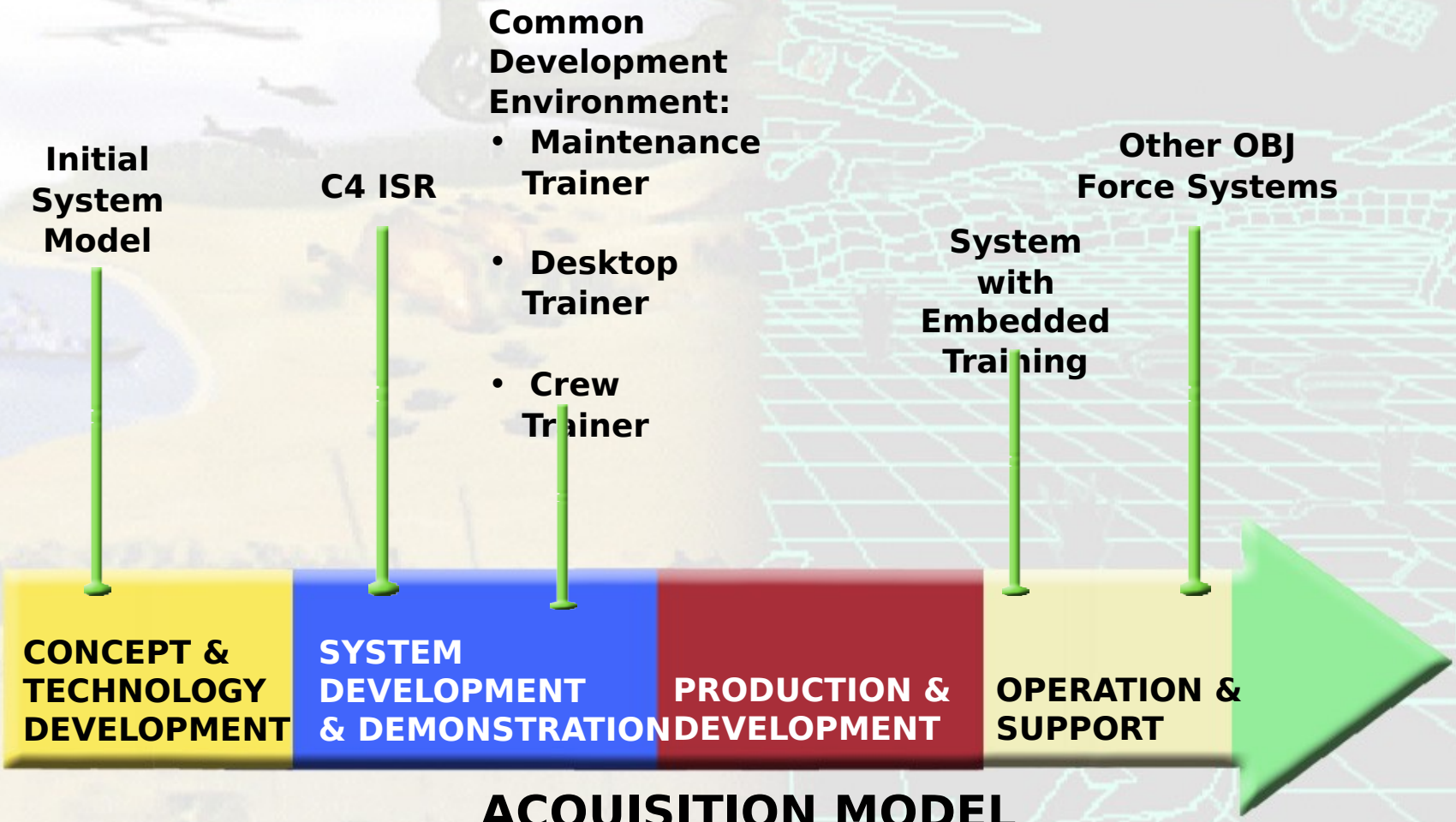


GOAL: MAXIMIZE OVERLAP IN UTILIZATION OF M&S TOOLS

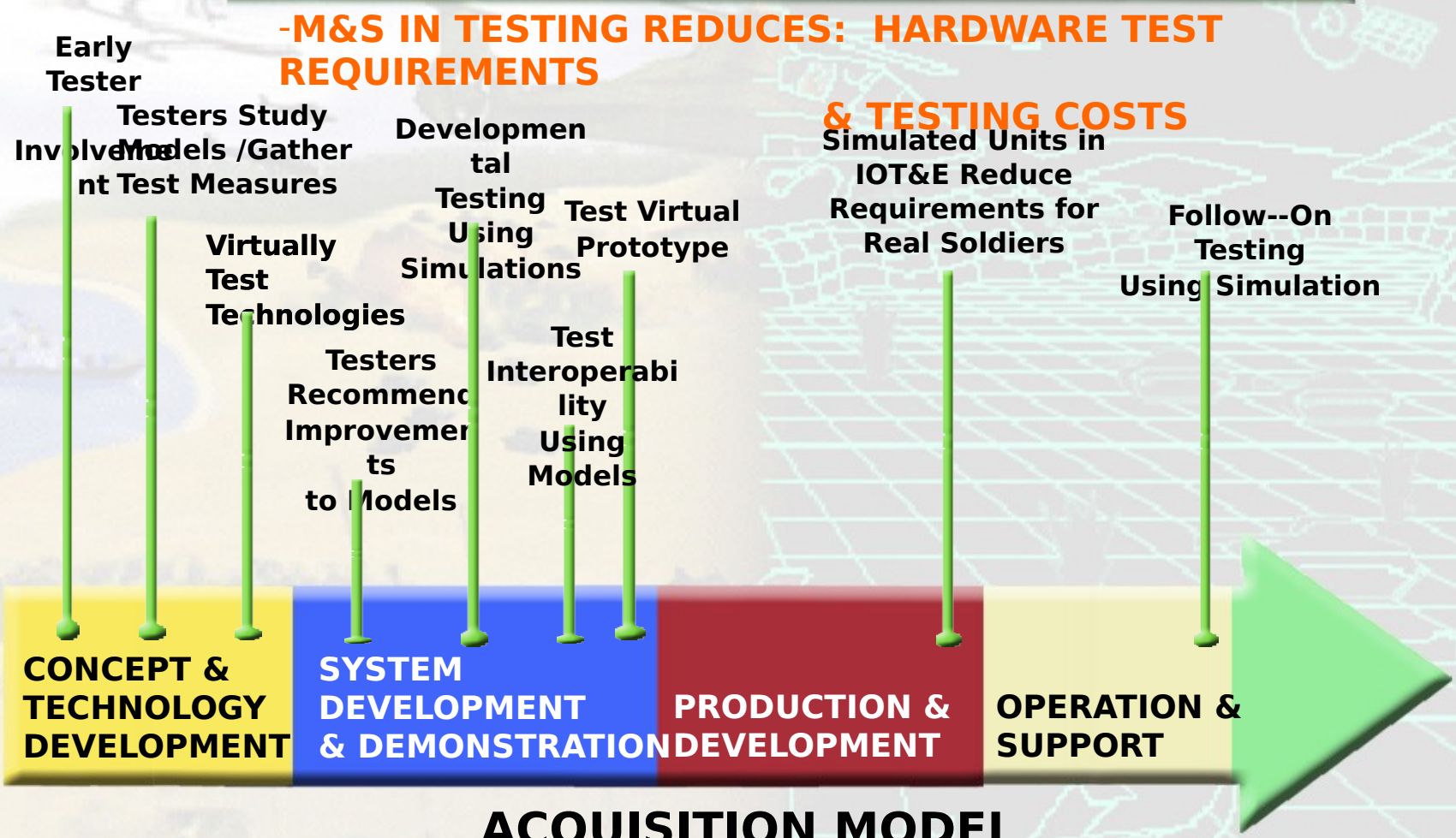
Modeling and Simulation in Engineering Development



Modeling and Simulation in Training



Modeling and Simulation in Testing


-M&S IN TESTING REDUCES: HARDWARE TEST REQUIREMENTS & TESTING COSTS
Early Tester Involvement
Testers Study Models /Gather Test Measures
Virtually Test Technologies
Testers Recommend Improvements to Models
Developmental Testing Using Simulations
Test Interoperability Using Models
Test Virtual Prototype
Simulated Units in IOT&E Reduce Requirements for Real Soldiers
Follow--On Testing Using Simulation
CONCEPT & TECHNOLOGY DEVELOPMENT
SYSTEM DEVELOPMENT & DEMONSTRATION
PRODUCTION & DEVELOPMENT
OPERATION & SUPPORT
ACQUISITION MODEL

Modeling and Simulation in Combat Developments

Concept Development

Experimentation

Insights

Leads to Decisions:
Doctrine
Training
Leadership
Organization
Materiel
Soldiers

Modeling and Simulation Can be a Better Test

- Amount of testing is increased
- Time required to Test is reduced
- Cost of Testing is reduced
- Testers and Evaluators must become involved earlier in development to:
  - Collaborate with and mentor Design Engineers . . . errors caught earlier
- Validate simulations and virtual prototypes using live testing
- Leverage examples from Industry
  - Boeing 777 Project

Modeling and Simulation Leads to Better Testing

PAC-3 MISSILE SUCCESS

- **Successfully predicted PAC3 Performance for all DT Flight Tests using PATRIOT M&S**

- **PAC3 program has had to complete only 4 Operational Tests due to the extensive Developmental Test and M&S capabilities developed.**

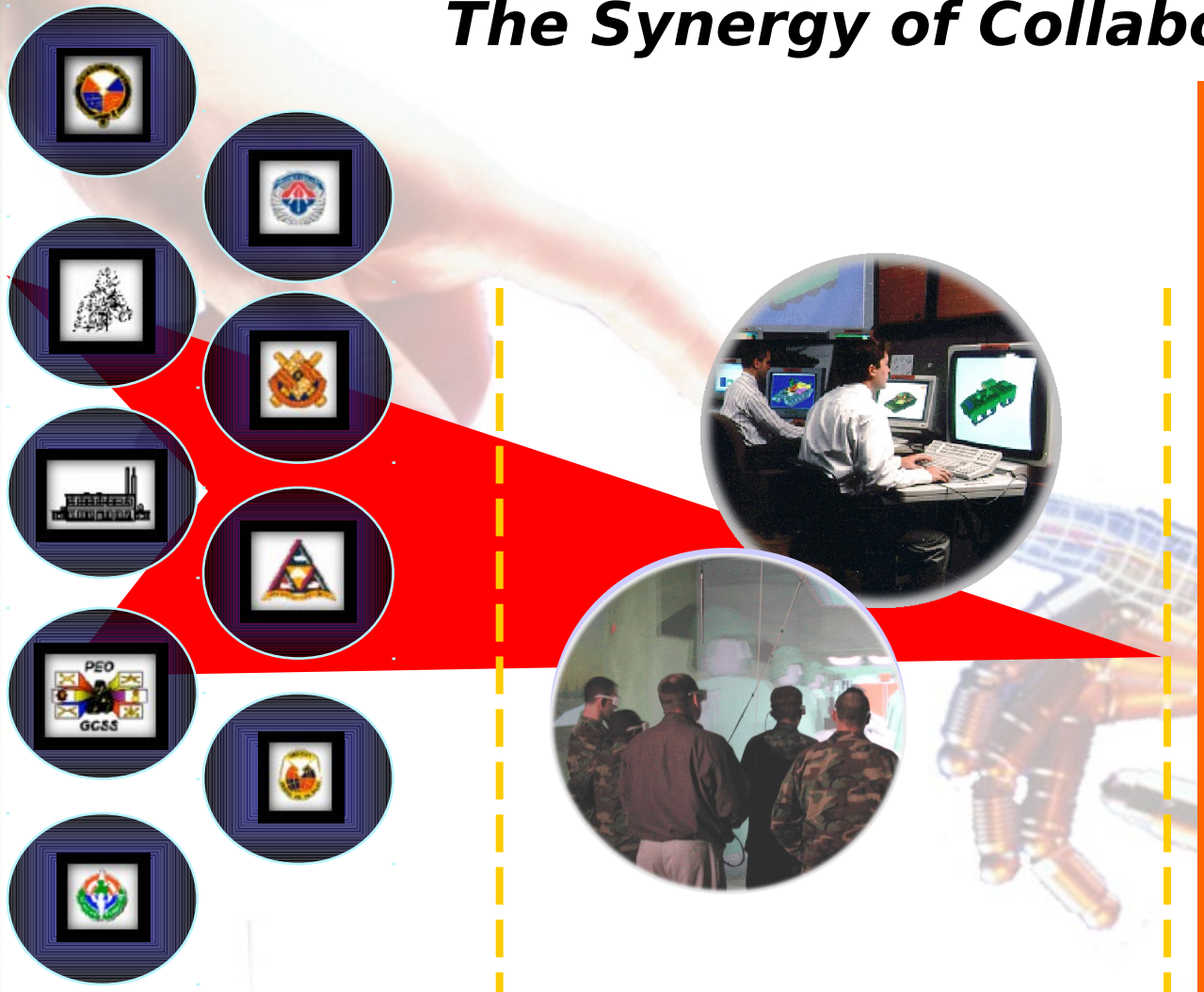
- **Simulations and HWIL was primary source for system performance evaluation data. Simulations and HWIL were validated with data from:**
  - Developmental Testing
  - Limited User Tests
  - Configuration Developmental Tests and Evaluation
  - Live Fire Test and Evaluation
  - System Integration Test II

SMART Collaboration With Entertainmen Industry/Academia

- System Embedded Training
- Use of Hollywood Concepts to create Immersive Environments
- Urban Environment Simulation
- Stability and Support Operations

U.S. Army Advanced Collaborative Environments (ACE)

The Synergy of Collaboration



- **Shortens the Cycle Time**
- **Lower Risk… Fewer Hidden Issues**
- **Make Better Quality Decisions**
- **Early Consensus**
- **Saves Money**

Challenges for our Team

- **FCS is a SMART program; without M&S as the primary means of developing and testing new designs – we won't make it by 2008**

- **The tools we need are available now**

It's Time to Take Action

- **We need innovators to field FCS this**

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